A 6 yo female presents with her parents for a standard WCC

History:
- Normal birth history
- No relevant family history
- No medications
- No allergies

Developmental Milestones
- Appropriate gross motor, social, and fine motor development
- Attends kindergarten and performs at the level of her peers
Height: 46.5 in
Weight: 30.8 kg

BMI: 22.1
PHYSICAL EXAM

- Vitals: BP 100/63  HR 101  Temp 98.0
- General: Caucasian female, alert, interactive, playful, appears stated age
- HENT: Atraumatic, pupils reactive and symmetrical, no LAD
- Chest: CTA, no sign of breast bud development, no axillary hair present
- Cardio: RRR, no murmur appreciated, symmetrical peripheral pulses
- Abdomen: Nontender, no palpable masses
- Derm: Congruent with race, no rashes or bruising
- Neuro: Normal muscle tone, appropriate DTRs, strength and sensation intact
PHYSICAL EXAM CONT’D

• Genitourinary
  • Cluster of long strands of dark coarse pubic hair present lateral and superior to the labia majora
    • Consistent with Tanner stage 3
  • No sign of labial irritation, no vaginal discharge or bleeding
DIFFERENTIAL DIAGNOSES TO CONSIDER?

- Ideas?
DIFFERENTIAL DIAGNOSES TO CONSIDER

• Prolonged Hypothyroidism
• Hypertrichosis
• Precocious puberty of any cause
• Exogenous steroid exposure
• Congenital Adrenal Hyperplasia
• PCOS
• Malignancy (Adrenal vs Pituitary)
• McCune Albright Syndrome
**INVESTIGATION**

<table>
<thead>
<tr>
<th>Bloodwork</th>
<th>Normal Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>TSH</td>
<td>3.47 mIU/L</td>
</tr>
<tr>
<td>Estradiol</td>
<td>&lt;11 pg/mL</td>
</tr>
<tr>
<td>LH</td>
<td>&lt;0.2 mIU/mL</td>
</tr>
<tr>
<td>FSH</td>
<td>1.3 mIU/mL</td>
</tr>
<tr>
<td>Random Glucose</td>
<td>78 mg/dL</td>
</tr>
<tr>
<td>Calcium</td>
<td>9.4 mg/dL</td>
</tr>
</tbody>
</table>
Parents appeared unconcerned about the presence of pubic hair, noted approx. 2 months prior while bathing the child (prior to 6th birthday)

No associated vaginal bleeding, no axillary hair

No family history of precocious puberty

No known exposure to exogenous steroids or androgens

Lives in a single family home with Mom, Dad, brother (age 8), and sister (age 13)

Mother and older sister both achieved menarche at approx. age 12
BONE AGE

X-ray enables us to monitor the progression of skeletal maturation through childhood.

- A – age 5
- B – age 7
- C – age 9
- D – age 11
- E – age 13
- F – age 15
INVESTIGATION

X-ray for Bone Age – AP view of the Left Hand

- Impression: The estimated skeletal age is 5 years, 9 months. (SD of 9 months)

Overall results of examination and testing: Normal 6yoF with an incidental finding of pubic hair (without clear cause).

Is further work up indicated?
A CLARIFICATION OF TERMS

- **Pubarche** = Development of pubic hair
- **Thelarche** = Breast development
- **Menarche** = Onset of menstruation
- **Adrenarche** = Hormone-based onset of secondary sexual characteristics (often interchanged with the term Pubarche)
- **Precocious Puberty**
  - **Gonadotropin Dependent** = central dysregulation leading to early release of GnRH (early activation of the HPG axis)
  - **Peripheral** = Results from intrinsic adrenal/gonadal disorders or from exogenous hormone exposure
TANNER STAGES – SEXUAL MATURITY RATING
SEXUAL DEVELOPMENT

• Normal progression of puberty in females:
  Thelarche – 1 year – Pubarche – 1.5 years – Menarche

• The average age of the onset of puberty varies according to sex and race:
  Caucasian girls       10.5 years old
  African American girls 8.8 years old
  Boys (across races)      12.0 years old
HPG AXIS AND HORMONE RELEASE

http://www.sfu.ca/~kgsalvan/Stress_and_Maternal_and_Child_Health_files/HPA%20HPG%20axes.png
American Academy of Pediatrics

- Breast and pubic hair development is seen in 20% Non-Hispanic Black females and 5% of Non-Hispanic White females between the ages of 6 and 8.
- Hypertrichosis is likely a confounding factor in observational studies given the similarity to Tanner Stage 2 pubic hair.
- BMI >85th percentile is strongly associated with attaining stage 3 pubic hair prior to age 8 in girls but no correlation is seen in boys.
LITERATURE REVIEW

Pediatrics in Review

- Pubarche and/or thelarche prior to age 8 in Caucasian girls is considered to be premature.
- Thelarche has been shown to be normal at age 7 in NonHispanic African American and Mexican American populations.
- Incidence of precocious puberty in the US is between 0.01% and 0.05% and vastly more common in females (x4).
- On average, overweight and obese girls experience puberty 0.5y earlier than girls with normal BMIs.
- Exogenous steroid sources include oral contraceptives, skin creams, meat from hormone treated animals, plant phytoestrogens, and anabolic steroids.
• Diagnosis: Idiopathic Premature Pubarche
  • No further work up necessary
  • Continue standard screening practices for growth and development
  • Concerning the elevated BMI: recommend increased physical activity and reduce intake of “empty calories”
TAKE HOME POINTS

- Obesity is associated with the onset of premature puberty in females.
- Premature Pubarche may be a normal variant in the absence of thelarche and other signs of sexual development.
- Bone age should be established with X-ray imaging immediately in order to aid diagnosis and to prevent loss of overall height potential.
REFERENCES


